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ECONOMICS FOR OUR SOUTHERN FORESTS

By

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This paper releases data gathered in current investigations at the Southern Forest Experiment Station, and is subject to correction or modification following further investigation.

ECONOMICS OF OUR SOUTHERN FORESTS 1/

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This paper will point out briefly the part played in the general economy by the forests of the South, and the opportunity they offer to bring about a greater measure of prosperity to this section of the country. The importance of forests to Florida will be indicated by some of the data presented.

Viewed from the angle of land area involved, the forest economy of the South ranks above the agricultural. The Southern Forest Experiment Station, a regional forest research unit of the United States Forest Service, has recently completed a field inventory of the forest resources on an area of 216 million acres. Including those portions of South Carolina and Arkansas not covered by the Survey, the gross land area in the lower South totals nearly 237 million acres. 2/ Of this latter area, 60 percent, or slightly more than 140 million acres, is forest land. Although exact data are not yet available as to how much timber is standing on this vast domain, we know that it represents a resource of immense value. Furthermore, it is a resource that, under proper management, will renew itself, and indeed is capable of yielding greater volumes of forest products in the future than it has in the past. Any general study of the economy of the South cannot overlook the part which this forest empire can and should play. As a matter of fact, the total value of the forest land, timber and forest-products utilization plants in the South is conservatively estimated at nearly two billion dollars.

As a source of tax revenue, it is estimated that the South's forest land and timber represent nearly 10 percent of the assessed valuation of all property -- real and personal, rural and urban. This forest land and timber was assessed in 1935 at about $450,000,000, or the equivalent of $3.21 per acre. Unfortunately, not all this assessment yields a tax revenue, owing to widespread tax delinquency which has resulted in the nominal forfeiture for unpaid taxes (in 1934) of some 17 million acres of forest land, out of a total of over 31 million acres of all delinquent lands in this region. The situation in Florida in respect to tax default is more serious than in any other Southern State. In 1934, there were in tax default for 3 or more years over 12 million acres, or more than one-third of the gross land area of the State. Of this area, approximately 8 million acres were forest land.

1/ Address delivered at the Rollins College Economic Conference, Winter Park, Florida, February 2, 1937.

2/ In this discussion, the Southern States referred to include South Carolina, Florida, Georgia, Alabama, Mississippi, Louisiana, Arkansas, eastern Texas, and southeastern Oklahoma (timbered portions of latter 2 States).

Measured by value of products, southern forest industries rank high. According to the latest United States Census figures, the value of all products derived from southern forests including lumber and timber, cooperage, wooden boxes, naval stores, wood distillates, charcoal, pulpwood, etc., amounted (in 1933) to $185,000,000, or 8 percent of the value of all manufactured products of this region. The value of forest products for the years since 1933 will undoubtedly show a substantial increase. Only as recently as 1929, the value of manufactured forest products in these 9 Southern States totalled approximately $600,000,000.

The labor requirements of the forest industries have, of course, declined somewhat with the falling off in production during the recent depression. Nevertheless, in 1934, the production of commercial forest products in the part of this region recently covered by our forest survey (216 million acres) required the equivalent of full-time labor of about 122,000 men in the woods and 87,000 men in the plants, or a total of 209,000 men. The actual number of individuals employed was considerably more than this number, as many are employed only part time in these industries. Assuming 4 persons to a family, about 836,000 persons were directly dependent on the forest industries in these States during 1934. These figures just given refer only to commercial products derived directly from the forest. In addition, it is estimated that the equivalent of full-time labor for 150,000 men is required annually in producing fuelwood, fence posts, and other products used on farms, obtained by farmers from their own woodlands. The distribution of the commercial labor among the major forest industries is shown in the following table:

ESTIMATED FULL-TIME LABOR REQUIREMENTS OF FOREST INDUSTRIES IN ALL OR PORTIONS OF 8 SOUTHERN STATES -- 1934 1/

Commercial products	Number of full-time laborers			Man-days labor per unit of product	
	Woods	Mill	Total	Man-days	Unit
Lumber	33,220	59,230	92,450	3.00	MBF Int. 1/4"
Naval stores	43,120	2,600	45,720	660.	Crop 10,000 faces
Cross ties 2/	11,453	-	11,453	.14	Tie
Poles and piling	1,548	-	1,548	.176	Piece
Veneer	4,612	4,828	9,440	3.68	MBF Int. 1/4"
Cooperage	2,917	3,877	6,794	3.64	MBF Int. 1/4"
Pulpwood	7,761	10,435	18,196	3.22	Cords
Treating plants	-	3,155	3,155	19.00	M cu. ft.
Miscellaneous	1,842	2,514	4,356	6.58	MBF Int. 1/4"
Fuelwood 3/	15,932	-	15,932	1.52	Cord
Total commercial	122,405	86,639	209,044		

1/ Includes Alabama, Florida, Georgia, Louisiana, Mississippi, southeastern South Carolina, eastern and southern Arkansas, and east Texas. Based on 200 working days per year, the average for these industries.
2/ Includes some commercial fence posts.
3/ In addition to this item, the labor used in cutting fuelwood and other forest products used on the farm is equivalent to full-time employment for approximately 150,000 men.

Comparing forest-products industries with all other industries, the most recent Census figures (1933) indicate that the forest industries employed 22 percent of all industrial wage-earners in these 9 States, and paid 14 percent of all industrial wages.

I have covered briefly the present place of our forests in the industrial economy of the South. Now, as to some of the future possibilities:

It has been prophesied-- we foresters have said it ourselves at various times in the past-- that within 10 or 20 years, or some similarly brief period, most of the commercial timber in the South would be gone, and with it would disappear the industries dependent upon it. That statement was true for certain limited areas, but fortunately it did not hold for the South as a whole. The prophesies did not take into account the marvelous recuperative powers of our southern cut-over forest lands, influenced as they are by soil and climatic conditions exceptionally favorable to forest growth. Illustrations can be found, of course, of devasted southern forest lands, of ghost towns resulting from the abandonment of the large lumber mills. These ghost towns stand as monuments to overcapitalization of timber holdings, to liquidation of timber assets, brought about by the rapid growth of the Nation as well as by other factors, and to lack of responsibility of stewardship over this great natural resource. But Nature has been kind to the South, and over great areas is now producing for us and for our children a new crop of timber which, if properly managed, will support most of our present forest industries, and many new units, in perpetuity.

Let me elaborate briefly on some of these future possibilities, particularly for the gum naval-stores industry and for the recently expanding pulp and paper industry. Florida has a special interest in gum naval stores, of which it produces about 30 percent of the total in the South, and in pulp mills, with the largest mill in operation in the South (Panama City) and two projected mills (Fernandina and Port St. Joe).

The United States for more than a century has been the world's largest producer of turpentine and rosin. This naval-stores industry in normal years represents an annual output of approximately $50,000,000 worth of products. It is of basic importance to the Nation, as its products are used in the manufacture of paint, varnish, linoleum, paper, soap, ink, grease, synthetic camphor, and many other articles. A recent Forest Service survey shows that the naval-stores belt embraces an area of approximately 34 million acres of land on which longleaf and slash pines predominate. These two native species of pine are the only trees of importance in the commercial production of naval stores in this country. From this area come all of the gum and turpentine and rosin produced in the United States, and a large part (68.5 percent in 1930-31) of the entire world's production of these commodities. About one-half of the United States naval-stores production is exported.

In this naval-stores belt, our recent survey reveals that there are approximately eighteen hundred million (1,800,000,000) longleaf and slash pine trees 2 inches or more in diameter which have not been worked for naval stores. Most of these (1,225,000,000 trees) are under 6 inches in diameter. It is calculated, however, that sufficient trees will reach turpentining size (8 to 9 inches in diameter) each year to permit 24 million new trees to be brought into turpentining annually if the owners dedicate them to that use. This annual

increase offers a fair index of the sustained-yield possibility of this region for naval stores. In order to obtain continuous production of naval stores, it is necessary to add to the body of working trees each year a sufficient number of new faces (the chipped areas on the trees, from which the gum flows) on round (unturpentined) trees to offset the shrinkage due to mortality and the abandonment of worked-out trees. In the naval-stores belt as a whole, the ratio that this annual replacement bears to the total working body of faces approximates 1 to 8-1/3. Applying this ratio to the indicated annual income of 24 million new faces on fresh trees, it is estimated that a working body of 200 million faces (20,000 crops of 10,000 faces each) can be maintained in continuous production. Such an operation would, at current average yields, produce 800,000 units [1/] of naval stores, as contrasted with the present average production of 500,000 units. Expressed in more common terms, it is possible to increase the annual production of gum turpentine by 300,000 barrels, and the annual production of gum rosin by one million round barrels.

This rough appraisal of the future possibilities in the naval-stores industry is based upon a consideration of the naval-stores belt as a whole and on the assumption that all longleaf and slash pine trees would be worked for turpentine before cutting them for any other use. If any considerable number of trees were cut for pulpwood before reaching turpentine size or were kept unturpentined, to be made into poles, piling, lumber, or ties, potential naval-stores production would be correspondingly reduced.

Some of you may recognize the implication in these figures on potential naval-stores production. The naval-stores industry today could follow no surer and speedier road to bankruptcy than to produce 800,000 units a year. For the past several years, consumption has barely kept up with production, and each year until 1936 the carry-over has increased. Financial distress in the industry has been acute. Hence, while the South's forest resources would permit a considerable expansion in this industry, such development should await vastly improved demand by present consumers, and the development of new uses and new markets. Meanwhile, under the Agricultural Conservation Program, the naval-stores operators are retracting rather than expanding. Over 14 million turpentine faces were taken out of production after this program was initiated in July, 1936, in an effort to reduce anticipated overproduction. This action, along with adverse climatic factors, reduced production for the season to about 90 percent of normal; and prices, particularly of rosin, have shown substantial increases.

A naval-stores conservation program for 1937 has recently been announced by the Secretary of Agriculture with $1,400,000 set up for benefit payments. A feature of the new program for those who desire to accept its terms will be the requirement that conservative woods practices be used, including the prohibition of operating trees under 9 inches in diameter, or of placing more than one turpentine face on trees less than 14 inches in diameter. Another provision is that turpentine streaks shall not exceed 3/4 inches in depth nor more than an average of ½ inch in height. Furthermore, applicants must agree to provide fire protection to the land being worked, whether it is owned, leased, or otherwise controlled. Payments for compliance with this program, i.e., for reducing production, will be

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1/ One unit of naval stores equals one 50-gallon barrel of turpentine and three and one-third barrels of rosin of 500-pounds (gross) each.

one cent per face for turpentine faces remaining in operation during the 1937 season, and four cents per face for not turpentining trees under 9 inches in diameter which were worked in 1936 or discontinued under the 1936 program.

Within recent years, increasing attention has been given to the possibilities of expanding the pulp and paper industry in the South. At present, the South dominates the field in the production of pulpwood where the sulphate process is used, the principal products being brown Kraft wrapping paper, bags and boxboards. In 1934, there were 16 pulp mills in the Southern States making Kraft paper, with a daily capacity of about 3,400 tons.

Within the past year, several new Kraft pulp and paper mills have been under construction in the South, and the total capacity of these mills, with others that have been announced but on which construction is not yet under way, amounts to over 3,600 tons of pulp daily; the investment in these new plants amounts to about $65,000,000. These mills are designed primarily to produce Kraft paper, although at least two of them will produce bleached sulphate which will go into high-quality white paper. As yet, no southern mill has been erected for the production of newsprint. A recent news item, however, states that the mill at Port St. Joe, Florida, has plans for an annex where commercial development of newsprint manufacture from southern pine pulp will be carried on. A plant in Texas to produce newsprint is also contemplated.

Approximately 55 percent of our domestic pulp and paper needs are now imported, chiefly from Canada and the Scandinavian countries, costing us over $150,000,000 annually. The present annual consumption of pulpwood equivalents in the United States is approximately 14 million cords. A possible total future national requirement of 25 million cords annually can be used as a basis for estimating the contribution which the different forest sections of the United States can make in supplying this need and still conserve the Nation's forests.

Assuming complete dependence on domestic supplies to fill national requirements, a recent Forest Service report 1/ indicated that the South could be expected to supply 7-1/2 million (30 percent) of the 25 million cords required in the future, or more than any other single forest region of the country, including Alaska. It is further estimated on the same basis that the South can provide 2 million (30 percent) of the 6.6 million cords of newsprint required, 2 million (17 percent) of the 11.9 million cords of mechanical and sulphite pulp, 3.2 million (64 percent) of the 5 million cords of sulphate pulp, and 0.3 million (20 percent) of the 1.5 million cords of soda pulp. This estimate for the South is based on the assumption that the present installed production capacity for each process (chiefly sulphate in the South at present) would be maintained. Beyond this limit, prospective production was distributed with regard to relative accessibility, quantity of standing timber, current and theoretical future annual growth, suitability of species for the various processes of manufacture, and other pertinent factors. Those familiar with the pulp and paper possibilities in the South feel that this estimate is very conservative, especially in view of recent developments in chemical processes in the manufacture of newsprint from southern pines.

1/ National Pulp and Paper Requirements in Relation to Forest Conservation, Senate Document 115, 74th Congress, 1st Session, July 1935.

Among the factors which should be considered in the location of pulp mills are: (1) Availability of an ample and continuous supply of good-quality pulping cordwood, (2) labor supply, (3) power and fuel, (4) water, (5) chemical supplies, (6) transportation facilities, (7) proximity to markets, and (8) taxes, etc. The South has an advantage in low transportation costs from woods to mill and from mill to market. In 1928, the average cost in the United States of transporting a cord of pulpwood from forest to mill was $3.23; in the South it averaged $2.00 a cord. Low water rates on pulp from southern ports to New York and other northern centers, coupled with low production costs, permit the southern pulp manufacturer to deliver his product to these consuming centers at extremely low prices compared with those for pulp from other regions.

Since wood is the most important single item of pulp cost, the South, because of its present and potential supply of timber, is particularly well situated to attract the newsprint and other paper industries. Studies made of standing cordwood volume in pulping species in specific areas in the South indicate that the South has for immediate conversion at least 250 million cords, making due allowance for the demands of other wood-using industries. This includes the volume in all trees over 5 inches in diameter at breast height which are of pulping species, and hence does not represent the volume now actually available for conversion into pulp. Growth conditions for this growing stock, however, fall far short of optimum. Furthermore, our best estimates indicate that, averaging all forest land together, even with the present incomplete stocking, the annual growth is around one-third cord per acre per year. At this rate, on the 140 million acres of southern forest land there are now being produced about 47 million cords annually. Approximately three-fourths of this growth is in pulping species, or a total of approximately 35 million cords.

Under intensive forest management on the better forest sites, and with an adequate growing stock, an average growth of 1 cord or more per acre-year can be expected. There should be no difficulty in obtaining pulpwood of suitable size and quality for many paper products from any one of a great many localities in the South. Abundant low-priced raw materials, rapid tree growth, easy logging conditions, an ample supply of good water, relatively low labor costs, and favorable freight differentials to northern markets, form a combination of factors assuring that the South will play a prominent role in supplying the United States with a large proportion of its future paper requirements.

Although the prospects of a successful expansion of the pulp and paper industry in the South are full of promise, certain precautions must be observed if this expansion is to be permanent. In our opinion the following policies should govern this expansion:

1. There should be no greater installation of paper mills than the South can support from timber not needed for established forest-using industries.

2. Insofar as economic circumstances will permit, new pulp mills should be fairly well distributed throughout the region and not concentrated in restricted localities.

3. Each plant should be planned for permanency and should utilize the timber in its territory on a sustained-yield basis with full regard for the needs of other wood-using industries, integrating the production of pulpwood with other forest products of greater unit value.

In the lumber industry, the picture is somewhat different, although by no means as dark as was predicted a few years ago. It is true that most of the original pine and hardwood has been converted into lumber and other forest products. The harvesting of this original timber crop was an important step in the progress of the settlement of the nation. In many cases, the method of that conversion was destructive and wasteful, although not all of the blame is to be laid at the door of the lumber industry. Nevertheless, on most of the cut-over forest lands in the South today is a second-growth stand of timber which, <u>if properly managed</u>, will support a large forest industry forever. The character of the forest industries in the future, however, will not be the same as in the past. The day of the big mills, with daily capacities of 80,000 or more board feet, is already rapidly drawing to a close. Their place is being taken by smaller mills having a daily capacity of 40,000 feet or less. There are some exceptions to this trend, of course, particularly in the more favorable timber-growing locations in the South. Here large mills can be operated indefinitely, if sustained-yield forestry is practiced. Some operations will undoubtedly be placed on this basis as soon as the financial opportunities become more evident.

Thus far I have discussed only the future of the <u>industrial</u> use of the forest. There are, we should all recognize, other important uses of the forests. In the past, little attention has been paid by southern farmers to the values inherent in their farm woodlands. To be sure, several million dollars' worth of forest products are cut each year from these woodlands, some of which are sold and others used at home or in interfarm trade. Today more than half of all farm land in the South is in woodland, exceeding by 5 million acres the total area in agricultural crops. Too little attention, however, has been given to conserving the forest values through judicious management of these farm woodlands. Although farmers cannot carry on work in the woods the entire year, they can add considerably to their present and future incomes by taking a few simple forestry measures, such as protecting their woods against fire and overgrazing, by cutting their fuelwood from overmature, suppressed, and defective trees, by thinning young stands to promote more rapid growth of desirable trees, and by "shopping around" to get the best prices for their stumpage or for forest products they cut themselves.

In yet another field, forests play an important role in the economy of the South. Their part in conserving soil, in preventing erosion, and in ameliorating flood conditions is not always recognized. The Southern Forest Experiment Station is conducting intensive field research in vegetative control of erosion, and on the effect of forest and other plant cover on run-off of rain water. Our studies thus far indicate that forests have an important regulatory influence on streamflow and ground water, and serve effectively to prevent soil wastage and flood damage.

The range livestock industry offers another example of the opportunity of using forest lands for purposes other than the production of timber. Most

of the South's forest land provides some grazing for livestock. This industry contributes an important share of the income and subsistence of southern farmers. It falls far short, however, of even supplying local market needs. Climate and soil conditions are favorable to a marked expansion in the livestock industry on southern forest ranges.

Forests are destined to become even more important in the future for recreation and the production of game. There is a marked trend toward the setting up by public agencies of game refuges and breeding grounds for wild life, where game will be produced under scientific management, and hunting permits will be issued to sportsmen at periodic intervals. On one national forest in the South, the income from such hunting licenses alone last year was $500.00, at a price of $5.00 per license. On another, where it was desired to reduce drastically the game population, more than 3,000 applications were received, of which only 1,700 were granted, these hunters paying $5.00 each for the privilege. On the same national forest, fishing brought in another $1,000, with licenses costing $1.00 per day.

Although this discussion thus far has dealt mainly with the South on a regional basis, a few figures will be included to indicate the importance of forests to Florida.

The forest survey recently completed by the U. S. Forest Service indicates that there are about 23,356,000 acres of forest land in Florida; this represents about two-thirds of the total land area of the state. Some 3,000,000 acres of this area, however, are classed as non-productive. Some of the balance may also be submarginal for timber growing at the present time.

Of the productive forest area covered by the survey, 78 percent is dominated by pines (on 92 percent of the pine land, longleaf and slash pines predominate), 15 percent by hardwoods, and 7 percent by cypress. Of the entire productive forest area, 15 percent is in old growth, 60 percent in second-growth of all sizes and 25 percent is clear-cut.

It is estimated that the total board-foot volume of merchantable timber standing in 1934 was slightly over 24 billion feet (International 1/4-inch scale), of which approximately 90 percent is now merchantable. Of this merchantable volume, 57 percent was in pine, 25 percent in hardwoods, and 18 percent in cypress. In addition to sawtimber material, there were almost 80 million cords of wood in smaller trees (from 5 inches in diameter to sawlog size), tops of sawlog-size trees and in culls, including all species of wood.

During the same year (1934) it is estimated that the forest industries in the state cut approximately 1.1 billion board feet and 328,000 cords of material for all purposes, including that used on farms.

By the beginning of 1936 the total estimated growing stock of sawlog material had dropped to 22-3/4 billion board feet. The annual increment during that year is estimated at about 710 million board feet; while the annual cut was about 1.5 billion board feet or more than twice the growth. This left a growing stock as of January 1, 1937, of about 22 billion board feet.

In 1934, there were a total of 912 lumber, veneer, and cooperage plants, turpentine stills, and other forest-utilization plants providing employment to the equivalent of 42,635 laborers in the woods and in the plants.

These figures on Florida are preliminary and subject to further change but are sufficiently accurate to give a picture of the current forest situation in the State. As additional forest land is brought under fire protection (at present about 2 million acres of private land and 1½ million acres of national forest and resettlement areas are being protected), and with the adoption of conservative forestry practices, growth and drain could be brought into balance. This will be necessary if Florida is to make full use of the forest land which makes up such a great proportion of its total area.

To conclude, let me briefly summarize the place of forestry in the future of the South. Private forestry can be practiced and be made to pay. One of the surest means of insuring a profit from forest lands is to make them serve many uses. One of the primary requisities is that only the annual production or "interest" be removed each year and that the capital stock or "principal" be conserved. On the National Forests, "multiple-use forestry" is the accepted policy of management. If we are to have sustained-yield private forestry, it also must take into account such a policy of management.

To illustrate, assume a 50,000-acre forest in northeastern Florida fairly well stocked with second-growth longleaf and slash pines, typical of many such areas to be found in that region. The first task under a well-organized forest-management program is to insure adequate protection against uncontrolled fires. Such protection can usually be arranged in cooperation with the State forestry organization and with neighboring forest-land owners. An inventory of the timber resources and a determination of the growth rate is necessary. Certain trees can then be selected as best suited for a final crop of high-grade sawlogs. These trees would be reserved for this purpose, and the future management of the forest would be designed to produce in them the very highest quality of lumber. A portion of the remaining stand could then be turpentined conservatively, leaving the trees under 9 inches in diameter for future working, unless it may be desirable to remove some of the smaller trees to favor the growth of the better trees. Such thinnings would improve the growth and quality of the remaining stand, and could find a ready market at the nearest pulp mill. Certain other trees, if of suitable size and quality, could be cut for poles, piling, and railroad ties, and their tops and limbwood go into pulpwood. Game could be introduced into the area and could be increased with proper management, the annual production of game being taken off by leasing the hunting privileges. Some grazing could also be carried on, if it did not interfere with the primary purpose of producing timber. This is what is known as multiple-use, sustained-yield forestry where lumber, naval stores, pulpwood, poles, ties, livestock, and game are being produced on a permanent, continuous basis. The annual yield per acre from all these products, assuming intensive and efficient management, should be made to yield a substantial profit on the original investment. A recent study indicates that a net return per acre of 94 cents is possible at the present time, if such multiple use were adopted.

That is the goal, multiplied many times over, that we have in mind for the forests of the South. Its realization will bring about permanent employment of labor, permanent industries, permanent communities, more prosperous railroads and

other utilities, stable and broad tax bases, and a better standard of living for this section of the country. It is estimated that our southern forests can supply direct, permanent employment at living wages to at least 500,000 workers, thereby providing a living for 2 million people. This presents a different picture from the one of forest exploitation and community abandonment that has been so common in the past. It may not be too much to say that the wise development and use of her forest resources is the key to the economic and social betterment of Florida and of the other Southern States. Many public agencies, including the State forestry organizations and the United States Forest Service, are working to promote a fuller use of the South's forest resources, many of which are now but partially utilized. The final result is largely up to the private owners in whose hands over 90 percent of these forest lands are held. The rewards should well repay their best efforts.